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Docket No.: M4065.0067/P067

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Warren M. Farnsworth

Application No.: 09/118,080

Group Art Unit: 2814

Filed: July 17, 1998

Examiner: A. Chambliss

For: LEAD OVER CHIP SEMICONDUCTOR
DEVICES WITH A BALL GRID ARRAY (AS
AMENDED)

REQUEST FOR RECONSIDERATION

Commissioner for Patents
Washington, DC 20231

Dear Sir:

Responsive to the Office Action dated January 29, 2002 (Paper No. 16), please reconsider the above-identified U.S. Patent application in light of the following remarks.

Claims 1-7, 9-18, and 31-33¹ stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,858,815 to Heo et al. (hereinafter “Heo”) in view of U.S. Patent No. 4,769,744 to Neugebauer et al. (“Neugebauer”).

¹ Office Action Section 3 states (incompletely) that “[c]laims 1- are rejected . . .” Based upon the Disposition of Claims portion of the Office Action Summary, Applicant’s representative presumes that claims 1-7, 9-18, and 31-33 are all rejected under 35 U.S.C. § 103(a).

The Office Action acknowledges that “Heo fails to disclose an adhesive material that cures to about ninety percent of its maximum strength within two to three hours or twenty four to thirty six hours without exceeding one hundred fifty degrees Fahrenheit.” The Office Action asserts, however, that “Neugebauer discloses an adhesive material (i.e. epoxy adhesive) that cures at room temperature 24 degrees Celsius (i.e. 75.2 degrees Fahrenheit) for 24 hours and cures at 50 degrees Celsius (i.e. 122 degrees Fahrenheit) for one hour,” and that “[s]ince the adhesive material has been cured at room temperature then one skill in the art would readily recognized that at least ninety percent of the maximum strength of the material is reached at that point.”

The rejection under § 103(a) as being unpatentable over Heo in view of Neugebauer is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the pending claims.

Applicant first respectfully submits that no *prima facie* case of obviousness has been established because the asserted combination of references fails to either teach or suggest all of Applicant’s claim limitations. Specifically, the combination fails to teach or suggest the limitation of the adhesive material that “cures to about ninety percent of its maximum strength within two to three hours without exceeding one hundred fifty degrees Fahrenheit” (claims 1 and 13), or the limitation of the adhesive material that “cures to about ninety percent of its maximum strength within twenty four to thirty six hours at room temperature” (claim 10), plus any of the further limitations recited in the dependent claims.

Secondly, the claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings to attain the claimed invention. As acknowledged in the Office Action, “Heo fails to disclose an adhesive material that cures to about ninety percent of its maximum strength within two to three hours or twenty four to thirty six hours without exceeding one hundred fifty degrees Fahrenheit.”

Applicant respectfully submits that the Office Action’s reliance upon the disclosure of Neugebauer is misplaced. There is no suggestion in Neugebauer of employing an adhesive in the same type of service as that service in which Applicant’s claimed adhesive material is used. Neugebauer (“Semiconductor Chip Packages Having Solder Layers of Enhanced Durability”) is not directed to the subject matter of Applicant’s claimed invention, i.e., employing a tape with an adhesive material to facilitate electrically connecting integrated circuits to electrically conductive leads. The Office Action states (without citation of the portion of the reference upon which it relies) that “Neugebauer discloses an adhesive material (i.e. epoxy adhesive) that cures at room temperature 24 degrees Celsius (i.e. 75.2 degrees Fahrenheit) for 24 hours and cures at 50 degrees Celsius (i.e. 122 degrees Fahrenheit) for one hour.” The Office Action apparently relies upon Neugebauer’s disclosure of an epoxy at column 7, lines 45-48. At column 7, lines 43-44, however, Neugebauer discloses that “the housings [are] secured to the respective baseplates by epoxy adhesive.” Neugebauer, therefore, is employing his epoxy to assemble a housing for a power chip (see, e.g.,

Neugebauer Fig. 5, where housing wall 502 is attached to baseplate 501), not to make the semiconductor devices themselves, as claimed by Applicant.

As further evidence of the completely different service in which the Neugebauer epoxy is employed, Neugebauer discloses that the baseplate is metallic and that the housing is epoxy. See, for example, Neugebauer's disclosure at column 3, lines 20-24 (and in Fig. 1), of package 100 that includes "a metallic baseplate 102, preferably of copper, and a housing 104, preferably of an epoxy, secured to baseplate 102 at an interface 106, as with epoxy (not shown)"(emphasis added).

There is, therefore, no suggestion in Neugebauer of employing an epoxy in the same type of service as that service for which the Office Action relies upon Neugebauer, i.e., for fulfilling Heo's failure to disclose an adhesive material that "cures to about ninety percent of its maximum strength within two to three hours or twenty four to thirty six hours without exceeding one hundred fifty degrees Fahrenheit" (quoting Office Action Section 3, lines 14-16) and that is employed as "a low temperature curing adhesive 30 (i.e., epoxy adhesive) located between the chip 11 and the dielectric layer 21" (quoting Office Action Section 3, lines 5-6). Applicant respectfully submits that there is no suggestion in either reference that an epoxy chosen for the service of Neugebauer (joining an epoxy housing to a metallic baseplate) would function for the service in which the Office Action employs it in Heo.

Furthermore, even if the references were combined as asserted in the Office Action, the combined disclosures would not result in the claimed invention, which comprises, *inter alia*, an adhesive material that “cures to about ninety percent of its maximum strength within two to three hours without exceeding one hundred fifty degrees Fahrenheit” (claims 1 and 13), or “cures to about ninety percent of its maximum strength within twenty four to thirty six hours at room temperature” (claim 10). Neugebauer is completely silent as to the strength of the epoxy that can be achieved.

The rejection of claims 31-33 is similarly traversed. Applicant’s claim 31 defines a semiconductor device that comprises in pertinent part “an anisotropically conductive material located between said single dielectric layer and said semiconductor chip.” Heo discloses an “adhesive means 30” that “comprises an epoxy adhesive or an adhesive film” (column 5, lines 18-20). As indicated above, Neugebauer discloses an epoxy for a completely different service, i.e., joining an epoxy housing to a metallic baseplate. Neither reference suggests Applicant’s claimed semiconductor device comprising an anisotropically conductive adhesive material.

It is respectfully submitted, therefore, that not only do the combined references fail to either teach or suggest all of Applicant’s claim limitations, but that there is neither a suggestion nor a motivation in the combination of references to derive the embodiments defined by any of Applicant’s pending claims.

For at least the above reasons, reconsideration and withdrawal of the rejection of the claims under § 103(a) are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: April 29, 2002

Respectfully submitted,

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